



SEQUENCE LISTING

<110> Milich, David R.
Billaud, Jean-Noel

<120> Rodent Hepatitis B Virus Core Proteins as Vaccine Platforms and Methods of Use Thereof

<130> VACCINE-07083

<140> 10/630,070
<141> 2003-07-30

<160> 101

<170> PatentIn version 3.2

<210> 1
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<212> PRT
<213> Woodchuck hepatitis virus

<400> 1

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu
1 5 10 15

Asn Phe Leu Pro Leu Asp Phe Phe Pro Asp Leu Asn Ala Leu Val Asp
20 25 30

Thr Ala Thr Ala Leu Tyr Glu Glu Leu Thr Gly Arg Glu His Cys
35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Asp Glu
50 55 60

Leu Thr Lys Leu Ile Ala Trp Met Ser Ser Asn Ile Thr Ser Glu Gln
65 70 75 80

Val Arg Thr Ile Ile Val Asn His Val Asn Asp Thr Trp Gly Leu Lys
85 90 95

Val Arg Gln Ser Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln
100 105 110

His Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Trp Ile Arg Thr
115 120 125

Pro Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro
130 135 140

Glu His Thr Val Ile Arg Arg Arg Gly Gly Ala Arg Ala Ser Arg Ser
145 150 155 160

Pro Arg Arg Arg Thr Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro
165 170 175

Arg Arg Arg Arg Ser Gln Ser Pro Ser Ala Asn Cys
180 185

<210> 2
<211> 39
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<213> Woodchuck hepatitis virus

<400> 2

Arg Arg Arg Gly Gly Ala Arg Ala Ser Arg Ser Pro Arg Arg Arg Thr
1 5 10 15

Pro Ser Pro Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser
20 25 30

Gln Ser Pro Ser Ala Asn Cys
35

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<213> Woodchuck hepatitis virus

<400> 3

Arg Arg Arg Cys
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<210> 4
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<400> 4

Arg Arg Arg Arg Cys
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<210> 5
<211> 4
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<213> Woodchuck hepatitis virus

<400> 5

Lys Lys Lys Cys
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<210> 6
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<213> Woodchuck hepatitis virus

<400> 6

Ala Ala Ala Cys
1

<210> 7
<211> 23
<212> PRT
<213> Woodchuck hepatitis virus

<400> 7

Ala Ala Gly Gly Ala Arg Ala Ser Arg Ser Pro Ser Gln Ser Pro Ser
1 5 10 15

Gln Ser Pro Ser Ala Asn Cys
20

<210> 8
<211> 21
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<213> Woodchuck hepatitis virus

<400> 8

Ala Ala Gly Gly Ala Arg Ala Ser Arg Ser Gln Ser Pro Ser Gln Ser
1 5 10 15

Pro Ser Ala Asn Cys
20

<210> 9
<211> 20
<212> PRT
<213> Woodchuck hepatitis virus

<400> 9

Ala Ala Gly Gly Ala Arg Ala Ser Arg Ser Gln Ser Ser Gln Ser Pro
1 5 10 15

Ser Ala Asn Cys
20

<210> 10
<211> 19
<212> PRT
<213> Woodchuck hepatitis virus

<400> 10

Ala Ala Gly Gly Ala Arg Ala Ser Arg Ser Gln Ser Ser Gln Ser Ser
1 5 10 15

Ala Asn Cys

<210> 11
<211> 15
<212> PRT
<213> Woodchuck hepatitis virus

<400> 11

Arg Arg Gly Gly Ala Arg Ala Ser Gln Ser Pro Ser Ala Asn Cys
1 5 10 15

<210> 12
<211> 15
<212> PRT
<213> Woodchuck hepatitis virus

<400> 12

Ala Arg Gly Gly Ala Arg Ala Ser Gln Ser Pro Ser Ala Asn Cys
1 5 10 15

<210> 13
<211> 15
<212> PRT
<213> Woodchuck hepatitis virus

<400> 13

Arg Ala Gly Gly Ala Arg Ala Ser Gln Ser Pro Ser Ala Asn Cys
1 5 10 15

<210> 14
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<212> PRT
<213> Woodchuck hepatitis virus

<400> 14

Ala Ala Gly Gly Ala Arg Ala Ser Gln Ser Pro Ser Ala Asn Cys
1 5 10 15

<210> 15
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<212> PRT
<213> Woodchuck hepatitis virus

<400> 15

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Arg Glu Ser
1 5 10 15

Gln Cys

<210> 16
<211> 18
<212> PRT
<213> Woodchuck hepatitis virus

<400> 16

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Pro Ser Ala
1 5 10 15

Asn Cys

<210> 17
<211> 17
<212> PRT
<213> Woodchuck hepatitis virus

<400> 17

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Ser Ala Asn
1 5 10 15

Cys

<210> 18
<211> 15
<212> PRT
<213> Woodchuck hepatitis virus

<400> 18

Ala Ala Gly Arg Ser Gln Ser Pro Ser Gln Ser Ser Ala Asn Cys
1 5 10 15

<210> 19
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 <213> Woodchuck hepatitis virus

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 Ala Ala Gly Arg Ser Pro Ser Gln Ser Ser Gln Ser Ala Asn Cys
 1 5 10 15

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 <400> 20

 Ala Ala Gly Arg Ser Gln Ser Ser Gln Ser Ala Asn Cys
 1 5 10

 <210> 21
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 <213> Ground squirrel hepatitis virus

 <400> 21

 Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu
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 Asn Phe Leu Pro Leu Asp Phe Phe Pro Asp Leu Asn Ala Leu Val Asp
 20 25 30

 Thr Ala Ala Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys
 35 40 45

 Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Glu Glu
 50 55 60

 Leu Thr Arg Leu Ile Thr Trp Met Ser Glu Asn Thr Thr Glu Glu Val
 65 70 75 80

 Arg Arg Ile Ile Val Asp His Val Asn Asn Thr Trp Gly Leu Lys Val
 85 90 95

 Arg Gln Thr Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln His
 100 105 110

 Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Trp Ile Arg Thr Pro
 115 120 125

Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro Glu
130 135 140

His Thr Val Ile Arg Arg Arg Gly Gly Ser Arg Ala Ala Arg Ser Pro
145 150 155 160

Arg Arg Arg Thr Pro Ser Pro Arg Arg Arg Ser Gln Ser Pro Arg
165 170 175

Arg Arg Arg Ser Gln Ser Pro Ala Ser Asn Cys
180 185

<210> 22
<211> 39
<212> PRT
<213> Ground squirrel hepatitis virus

<400> 22

Arg Arg Arg Gly Gly Ser Arg Ala Ala Arg Ser Pro Arg Arg Arg Thr
1 5 10 15

Pro Ser Pro Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser
20 25 30

Gln Ser Pro Ala Ser Asn Cys
35

<210> 23
<211> 23
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<213> Ground squirrel hepatitis virus

<400> 23

Ala Ala Gly Gly Ser Arg Ala Ala Arg Ser Pro Ser Gln Ser Pro Ser
1 5 10 15

Gln Ser Pro Ala Ser Asn Cys
20

<210> 24
<211> 21
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<213> Ground squirrel hepatitis virus

<400> 24

Ala Ala Gly Gly Ser Arg Ala Ala Arg Ser Gln Ser Pro Ser Gln Ser
1 5 10 15

Pro Ala Ser Asn Cys
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<210> 25

<211> 20

<212> PRT

<213> Ground squirrel hepatitis virus

<400> 25

Ala Ala Gly Gly Ser Arg Ala Ala Arg Ser Gln Ser Ser Gln Ser Pro
1 5 10 15

Ala Ser Asn Cys
20

<210> 26

<211> 19

<212> PRT

<213> Ground squirrel hepatitis virus

<400> 26

Ala Ala Gly Gly Ser Arg Ala Ala Arg Ser Gln Ser Ser Gln Ser Ala
1 5 10 15

Ser Asn Cys

<210> 27

<211> 15

<212> PRT

<213> Ground squirrel hepatitis virus

<400> 27

Arg Arg Gly Gly Ser Arg Ala Ala Gln Ser Pro Ala Ser Asn Cys
1 5 10 15

<210> 28

<211> 15

<212> PRT

<213> Ground squirrel hepatitis virus

<400> 28

Ala Arg Gly Gly Ser Arg Ala Ser Gln Ser Pro Ala Ser Asn Cys
1 5 10 15

<210> 29
<211> 15
<212> PRT
<213> Ground squirrel hepatitis virus

<400> 29

Arg Ala Gly Gly Ser Arg Ala Ser Gln Ser Pro Ala Ser Asn Cys
1 5 10 15

<210> 30
<211> 15
<212> PRT
<213> Ground squirrel hepatitis virus

<400> 30

Ala Ala Gly Gly Ser Arg Ala Ser Gln Ser Pro Ala Ser Asn Cys
1 5 10 15

<210> 31
<211> 18
<212> PRT
<213> Ground squirrel hepatitis virus

<400> 31

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Arg Glu Ser
1 5 10 15

Gln Cys

<210> 32
<211> 18
<212> PRT
<213> Ground squirrel hepatitis virus

<400> 32

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Pro Ala Ser
1 5 10 15

Asn Cys

<210> 33
<211> 17
<212> PRT
<213> Ground squirrel hepatitis virus

<400> 33

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Ala Ser Asn
1 5 10 15

Cys

<210> 34

<211> 15

<212> PRT

<213> Ground squirrel hepatitis virus

<400> 34

Ala Ala Gly Arg Ser Gln Ser Pro Ser Gln Ser Ala Ser Asn Cys
1 5 10 15

<210> 35

<211> 16

<212> PRT

<213> Ground squirrel hepatitis virus

<400> 35

Ala Ala Gly Arg Ser Pro Ser Gln Ser Ser Gln Ser Ala Ser Asn Cys
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<210> 36

<211> 14

<212> PRT

<213> Ground squirrel hepatitis virus

<400> 36

Ala Ala Gly Arg Ser Gln Ser Ser Gln Ser Ala Ser Asn Cys
1 5 10

<210> 37

<211> 567

<212> DNA

<213> Woodchuck hepatitis virus

<400> 37

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ttggacttct ttccctgacct taatgctttg gtggacactg ctactgcctt gtatgaagaa 120

gagctaacag gtagggaaca ttgctctccg caccatacag ctattagaca agcttttagta 180

tgctggatg aatataactaa attgatagct tggatgagct ctaacataac ttctgaacaa 240

gtaagaacaa tcattgtaaa tcattgtcaat gatacctggg gacttaaggt gagacaaaagt 300

ttatggtttc atttgtcatg tctcactttc ggacaacata cagttcaaga attttttagta 360

agttttggag tatggatcag gactccagct ccatatagac ctcctaattgc acccattctc 420

tcgactcttc	cggaacatac	agtcatagg	agaagaggag	gtgcaagagc	ttcttaggtcc	480										
cccagaagac	gcactccctc	tcctcgagg	agaagatctc	aatcacccgcg	tcgcagacgc	540										
tctcaatctc	catctgccaa	ctgctga				567										
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<212>	PRT															
<213> Woodchuck hepatitis virus																
<400>	38															
Met	Asp	Ile	Asp	Pro	Tyr	Lys	Glu	Phe	Gly	Ser	Ser	Tyr	Gln	Leu	Leu	
1				5			10						15			
Asn	Phe	Leu	Pro	Leu	Asp	Phe	Phe	Pro	Asp	Leu	Asn	Ala	Leu	Val	Asp	
				20			25					30				
Thr	Ala	Thr	Ala	Leu	Tyr	Glu	Glu	Leu	Thr	Gly	Arg	Glu	His	Cys		
				35			40				45					
Ser	Pro	His	His	Thr	Ala	Ile	Arg	Gln	Ala	Leu	Val	Cys	Trp	Asp	Glu	
				50			55				60					
Leu	Thr	Lys	Leu	Ile	Ala	Trp	Met	Ser	Ser	Asn	Ile	Thr	Ser	Glu	Gln	
				65			70				75			80		
Val	Arg	Thr	Ile	Ile	Val	Asn	His	Val	Asn	Asp	Thr	Trp	Gly	Leu	Lys	
				85			90						95			
Val	Arg	Gln	Ser	Leu	Trp	Phe	His	Leu	Ser	Cys	Leu	Thr	Phe	Gly	Gln	
				100			105				110					
His	Thr	Val	Gln	Glu	Phe	Leu	Val	Ser	Phe	Gly	Val	Trp	Ile	Arg	Thr	
				115			120				125					
Pro	Ala	Pro	Tyr	Arg	Pro	Pro	Asn	Ala	Pro	Ile	Leu	Ser	Thr	Leu	Pro	
				130			135				140					
Glu	His	Thr	Val	Ile												
				145												

<210> 39
 <211> 564
 <212> DNA
 <213> Ground squirrel hepatitis virus

<400> 39
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 gaattaacag gtagggagca ttgttctcct catcatactg ctattagaca ggccttagtg 180
 tggtggaaag aattaactag attaattaca tggatgagtg aaaatacaac agaagaagtt 240
 agaagaatta ttgttcatca tgtcaataat acttggggac tttaagtaag acagacttta 300
 tggttcatt tatcatgtct tactttgga caacacacag ttcaagaatt ttggtagt 360
 ttggagtagt ggattagaac tccagctcct tatagaccac ctaatgcacc catttatca 420
 actctccgg aacatacagt cattaggaga agaggagtt caagagctgc taggtcccc 480
 cgaagacgca ctccctctcc tcgcaggaga aggtctaat caccgcgtcg cagacgtct 540
 caatctccag cttccaaactg ctga 564

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 <213> Ground squirrel hepatitis virus

<400> 40

Met	Asp	Ile	Asp	Pro	Tyr	Lys	Glu	Phe	Gly	Ser	Ser	Tyr	Gln	Leu	Leu
1															15

Asn	Phe	Leu	Pro	Leu	Asp	Phe	Phe	Pro	Asp	Leu	Asn	Ala	Leu	Val	Asp
															30

Thr	Ala	Ala	Ala	Leu	Tyr	Glu	Glu	Leu	Thr	Gly	Arg	Glu	His	Cys
35					40				45					

Ser	Pro	His	His	Thr	Ala	Ile	Arg	Gln	Ala	Leu	Val	Cys	Trp	Glu	Glu
50					55				60						

Leu	Thr	Arg	Leu	Ile	Thr	Trp	Met	Ser	Glu	Asn	Thr	Thr	Glu	Glu	Val
															80
65					70				75						

Arg	Arg	Ile	Ile	Val	Asp	His	Val	Asn	Asn	Thr	Trp	Gly	Leu	Lys	Val
															95
85					90										

Arg	Gln	Thr	Leu	Trp	Phe	His	Leu	Ser	Cys	Leu	Thr	Phe	Gly	Gln	His
100					105					110					

Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Trp Ile Arg Thr Pro
115 120 125

Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro Glu
130 135 140

His Thr Val Ile
145

<210> 41
<211> 183
<212> PRT
<213> Human hepatitis B virus

<400> 41

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu
1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp
20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys
35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu
50 55 60

Leu Met Thr Leu Ala Thr Trp Val Gly Val Asn Leu Glu Asp Pro Ala
65 70 75 80

Ser Arg Asp Leu Val Val Ser Tyr Val Asn Thr Asn Met Gly Leu Lys
85 90 95

Phe Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg
100 105 110

Glu Thr Val Ile Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr
115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro
130 135 140

Glu Thr Thr Val Val Arg Arg Arg Gly Arg Ser Pro Arg Arg Arg Thr
145 150 155 160

Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser
165 170 175

Gln Ser Arg Glu Ser Gln Cys
180

<210> 42
<211> 34
<212> PRT
<213> Human hepatitis B virus

<400> 42

Arg Arg Arg Gly Arg Ser Pro Arg Arg Arg Thr Pro Ser Pro Arg Arg
1 5 10 15

Arg Arg Ser Gln Ser Pro Arg Arg Arg Ser Gln Ser Arg Glu Ser
20 25 30

Gln Cys

<210> 43
<211> 18
<212> PRT
<213> Human hepatitis B virus

<400> 43

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Arg Glu Ser
1 5 10 15

Gln Cys

<210> 44
<211> 16
<212> PRT
<213> Human hepatitis B virus

<400> 44

Ala Ala Gly Arg Ser Gln Ser Pro Ser Gln Ser Arg Glu Ser Gln Cys
1 5 10 15

<210> 45
<211> 15
<212> PRT
<213> Human hepatitis B virus

<400> 45

Ala Ala Gly Arg Ser Gln Ser Ser Gln Ser Arg Glu Ser Gln Cys
1 5 10 15

<210> 46
<211> 14
<212> PRT
<213> Human hepatitis B virus

<400> 46

Ala Ala Gly Arg Ser Gln Ser Ser Gln Ser Glu Ser Gln Cys
1 5 10

<210> 47
<211> 11
<212> PRT
<213> Human hepatitis B virus

<400> 47

Arg Arg Gly Ser Gln Ser Arg Glu Ser Gln Cys
1 5 10

<210> 48
<211> 11
<212> PRT
<213> Human hepatitis B virus

<400> 48

Ala Arg Gly Ser Gln Ser Arg Glu Ser Gln Cys
1 5 10

<210> 49
<211> 11
<212> PRT
<213> Human hepatitis B virus

<400> 49

Arg Ala Gly Ser Gln Ser Arg Glu Ser Gln Cys
1 5 10

<210> 50
<211> 11
<212> PRT
<213> Human hepatitis B virus

<400> 50

Ala Ala Gly Ser Gln Ser Arg Glu Ser Gln Cys
1 5 10

<210> 51
<211> 18
<212> PRT
<213> Human hepatitis B virus

<400> 51

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Pro Ser Ala
1 5 10 15

Asn Cys

<210> 52
<211> 18
<212> PRT
<213> Human hepatitis B virus

<400> 52

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Arg Glu Ser
1 5 10 15

Gln Cys

<210> 53
<211> 17
<212> PRT
<213> Human hepatitis B virus

<400> 53

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Glu Ser Gln
1 5 10 15

Cys

<210> 54
<211> 15
<212> PRT
<213> Human hepatitis B virus

<400> 54

Ala Ala Gly Arg Ser Gln Ser Pro Ser Gln Ser Glu Ser Gln Cys
1 5 10 15

<210> 55
<211> 16
<212> PRT
<213> Human hepatitis B virus

<400> 55

Ala Ala Gly Arg Ser Pro Ser Gln Ser Ser Gln Ser Glu Ser Gln Cys
1 5 10 15

<210> 56
<211> 14
<212> PRT
<213> Human hepatitis B virus

<400> 56

Ala Ala Gly Arg Ser Gln Ser Ser Gln Ser Glu Ser Gln Cys
1 5 10

<210> 57
<211> 552
<212> DNA
<213> Human hepatitis B virus

<400> 57
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gccttagagt ctcctgagca ttgttcacct caccatactg cactcaggca agcaattctt 180
tgctgggggg aactaatgac tctagctacc tgggtgggtg ttaatttggaa agatccagca 240
tccagagacc tagtagtcag ttatgtcaac actaatatgg gcctaaagtt caggcaactc 300
ttgtggttc acatttcttgc tctcactttt ggaagagaaa ccgttataga gtatttggtg 360
tcttcggag tgtggattcg cactcctcca gcttataagac caccaaatgc ccctatccta 420
tcaacacttc cgaaaaactac tggtgttaga cgacgaggca ggtcccctag aagaagaact 480
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tctcaatgtt ga 552

<210> 58
<211> 149
<212> PRT

<213> Human hepatitis B virus

<400> 58

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu
1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp
20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys
35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu
50 55 60

Leu Met Thr Leu Ala Thr Trp Val Gly Val Asn Leu Glu Asp Pro Ala
65 70 75 80

Ser Arg Asp Leu Val Val Ser Tyr Val Asn Thr Asn Met Gly Leu Lys
85 90 95

Phe Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg
100 105 110

Glu Thr Val Ile Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr
115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro
130 135 140

Glu Thr Thr Val Val
145

<210> 59
<211> 12
<212> PRT

<213> Artificial Sequence

<220>
<223> Synthetic

<400> 59

Val Ser Phe Gly Val Trp Ile Arg Thr Pro Ala Pro
1 5 10

<210> 60
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 60

Val Ser Phe Gly Val Trp Ile Arg Thr Pro Pro Ala
1 5 10

<210> 61
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 61

Val Cys Trp Asp Glu Leu Thr Lys Leu Ile Ala Trp Met Ser Ser Asn
1 5 10 15

Ile Thr Ser Glu Gln
20

<210> 62
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 62

Leu Cys Trp Gly Glu Leu Met Thr Leu Ala Thr Trp Val Gly Gly Asn
1 5 10 15

Leu Glu Asp Pro Ile
20

<210> 63
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 63
ggaaattctt ctcctcgag

19

<210> 64
<211> 24
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 64

Met Ser Leu Leu Thr Glu Val Glu Thr Pro Ile Arg Asn Glu Trp Gly
1 5 10 15

Cys Arg Cys Asn Asp Ser Ser Asp
20

<210> 65
<211> 18
<212> PRT
<213> Plasmodium vivax

<400> 65

Ala Asn Gly Ala Gly Asn Gln Pro Gly Ala Asn Gly Ala Gly Asp Gln
1 5 10 15

Pro Gly

<210> 66
<211> 18
<212> PRT
<213> Plasmodium vivax

<400> 66

Ala Asn Gly Ala Asp Asn Gln Pro Gly Ala Asn Gly Ala Asp Asp Gln
1 5 10 15

Pro Gly

<210> 67
<211> 22
<212> PRT
<213> Plasmodium vivax

<400> 67

Ala Pro Gly Ala Asn Gln Glu Gly Gly Ala Ala Ala Pro Gly Ala Asn
1 5 10 15

Gln Glu Gly Gly Ala Ala
20

<210> 68
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 68

Asn Ala Asn Pro Asn Ala Asn Pro Asn Ala Asn Pro
1 5 10

<210> 69
<211> 260
<212> PRT
<213> Mus musculus

<400> 69

Met Ile Glu Thr Tyr Ser Gln Pro Ser Pro Arg Ser Val Ala Thr Gly
1 5 10 15

Leu Pro Ala Ser Met Lys Ile Phe Met Tyr Leu Leu Thr Val Phe Leu
20 25 30

Ile Thr Gln Met Ile Gly Ser Val Leu Phe Ala Val Tyr Leu His Arg
35 40 45

Arg Leu Asp Lys Val Glu Glu Val Asn Leu His Glu Asp Phe Val
50 55 60

Phe Ile Lys Lys Leu Lys Arg Cys Asn Lys Gly Glu Gly Ser Leu Ser
65 70 75 80

Leu Leu Asn Cys Glu Glu Met Arg Arg Gln Phe Glu Asp Leu Val Lys
85 90 95

Asp Ile Thr Leu Asn Lys Glu Glu Lys Lys Glu Asn Ser Phe Glu Met
100 105 110

Gln Arg Gly Asp Glu Asp Pro Gln Ile Ala Ala His Val Val Ser Glu
115 120 125

Ala Asn Ser Asn Ala Ala Ser Val Leu Gln Trp Ala Lys Lys Gly Tyr
130 135 140

Tyr Thr Met Lys Ser Asn Leu Val Met Leu Glu Asn Gly Lys Gln Leu
145 150 155 160

Thr Val Lys Arg Glu Gly Leu Tyr Tyr Val Tyr Thr Gln Val Thr Phe
165 170 175

Cys Ser Asn Arg Glu Pro Ser Ser Gln Arg Pro Phe Ile Val Gly Leu
180 185 190

Trp Leu Lys Pro Ser Ser Gly Ser Glu Arg Ile Leu Leu Lys Ala Ala
195 200 205

Asn Thr His Ser Ser Ser Gln Leu Cys Glu Gln Gln Ser Val His Leu
210 215 220

Gly Gly Val Phe Glu Leu Gln Ala Gly Ala Ser Val Phe Val Asn Val
225 230 235 240

Thr Glu Ala Ser Gln Val Ile His Arg Val Gly Phe Ser Ser Phe Gly
245 250 255

Leu Leu Lys Leu
260

<210> 70

<211> 25

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic

<400> 70

Gly Glu Ile Lys Asn Cys Ser Phe Asn Ile Ser Thr Ser Ile Arg Gly
1 5 10 15

Lys Val Gln Lys Glu Tyr Ala Phe Phe
20 25

<210> 71

<211> 26

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic

<400> 71

Leu Thr Ser Cys Asn Thr Ser Val Ile Thr Gln Ala Cys Pro Lys Val
1 5 10 15

Ser Phe Glu Pro Ile Pro Ile His Tyr Cys
20 25

<210> 72
<211> 25
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 72

Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala
1 5 10 15

Gly Phe Ala Ile Leu Lys Cys Asn Asn
20 25

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Lys Lys Lys Val Thr Ala Gln Glu Leu Asp
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Glu Glu

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Phe Arg His Asp Ser Gly Tyr
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Asp Thr Gly Phe Leu Ala Ala Leu
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Tyr Cys Phe Thr Pro Ser Pro Val
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Glu Ala Thr Tyr Ser Arg Cys Gly
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His Leu His Gln Asn Ile Val Asp
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Leu Ala Gln Lys Val Ala Arg Thr Leu Phe
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Leu Met Arg Ser Thr Thr Lys
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Leu Glu Ala

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Asp Pro Pro Pro Pro Asn Pro Asn Asp Pro Pro Pro Pro Asn Pro Asn
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Glu Glu Arg Ile Lys Gln Ile Gly Met Pro Gly Gly Lys Glu Glu
1 5 10 15